

ABSTRACT

A method of forming a copper interconnect in an opening within a pattern is described. The copper interconnect has an R_s that is nearly independent of opening width and pattern density. A first copper layer having a concave upper surface and thickness t_1 is formed in a via or trench in a dielectric layer by depositing copper and performing a first CMP step. A second copper layer with a thickness t_2 where $t_2 \leq t_1$ and having a convex lower surface is deposited on the first copper layer by a selective electroplating method. The first and second copper layers are annealed and then a second CMP step planarizes the second copper layer to become coplanar with the dielectric layer. The invention is also a copper interconnect comprised of the aforementioned copper layers where the first copper layer has a grain density (G_{D1}) $\geq G_{D2}$ for the second copper layer.